REMARKS

Claims 1, 3-9, 11-24 are pending in the application. Claims 1, 8, 11, and 19 have been amended and claims 2 and 10 have been cancelled. No new matter has been introduced by the amendment.

Rejection Under 37 C.F.R. § 1.75

Claim 18 has been rejected to as being substantially duplicative of Claim 11. This objection is overcome in view of the amendment of claim 11 in which its dependency has been changed from claim 8 to claim 1.

Claim 19 has been objected to for having the same scope as claim 18 from which it depends. This objection is overcome in view of the amendment of claim 19 in which the columnar crystals in the plated microcrystal layers are described as having a body centered cubit (bcc) crystal structure.

Rejection Under 35 U.S.C. § 112, second paragraph

Claims 15 and 16 have been rejected for allegedly reciting indefinite subject matter. In particular, claim 15 has been rejected for recitation of the claimed plated magnetic film in which a substantial portion of the Fe comprises Fe having a +2 oxidization state. The Applicants respectfully assert that one of ordinary skill in the art upon reading the Applicants' specification would fully comprehend the subject matter of claim 15. For example, in paragraph 0083, the Applicants describe magnetic pole layers 19 and 21 as being formed by "plating, while Fe ions are primarily in the state of Fe^{2+}. The Applicants further describe that the magnetic pole layers so formed exhibit improved saturation magnetic flux densities Bs. The Applicants further describe that the use of malonic acid in the plating bath and that Fe^{2+} is easily taken into the magnetic pole layers during the plating process. Accordingly, the Applicants assert that one skilled in the art would understand that the plated magnetic film, so formed, would contain a large amount of Fe having a +2 oxidization state. Further, those skilled in the art of plating processes will fully comprehend the relatively amount of Fe^{2+} that can be incorporated into a magnetic film using the described plating process.

Claim 16 has been rejected for reciting that the plated magnetic film comprise a substantially sulfur-free electroplated magnetic film. The Applicants' respectfully assert that one skilled in the art upon reading their specification would fully comprehend the subject matter of claim 16. For example, in paragraph 18, the Applicants describe that the magnetic film of the present invention does not contain sulfur. Accordingly, the Applicants assert that one skilled in the art would understand that substantially sulfur-free applies to magnetic films having essentially no sulfur or sulfur at an essentially undetectable concentration level.

Rejection Under 35 U.S.C. § 102(e)

Claims 1 and 6 have been rejected over Funayama et al. This rejection is overcome in view of the amendment of Claim 1 together with the following remarks. The applicants assume the assertion of Funayama et al. relies upon the filing date of the identified priority application.

The Applicants' respectfully assert that Funayama et al. do not suggest or disclose their claimed invention. This is at least because Funayama et al. do not disclose a CoFe magnetic film in which columnar crystals are adjacent to one another and are separated by grain boundaries extending in the film thickness direction. Instead, Funayama et al. disclose a granular CoFe film disbursed in an insulator matrix composed of aluminum oxide. (See paragraph 0078). Accordingly, Funayama et al. does not disclose adjacent CoFe columnar crystals.

The Applicants respectfully disagree with the assertion in the instant Office Action at page 4 that Funayama et al. describe and disclose the Applicants' claimed CoFe film. Rather than disclosing a CoFe film, in paragraph 0148 and Figs. 16 and 17, Funayama et al. disclose a NiFe film. Regardless of the morphology of the disclosed NiFe film, it is not the claimed CoFe film. Accordingly, the Applicants assert that the rejection of their pending claims over Funayama et al. should be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 3-5 have been rejected over Funayama et al. further in view of Sasaki et al. This rejection is overcome in view of the amendment and remarks pertaining to Claim 1 from which they depend.

Claim 7 has been rejected over Funayama et al. and Sato et al. This rejection is overcome in view of the amendment and remarks pertaining to Claim 1 from which claim 7 depends. The Applicants further assert that the surface roughness recited in claim 7 is not disclosed by the cited references. Although Sato et al. refer to a magnetic layer having a high surface roughness, the solution taught by Sato et al. is to polish the surface of the layer through chemical mechanical polishing or the like so as to flatten the surface (See Sato et al., para. 0145).

Claims 8 and 9 have been rejected over Kudo et al. in view of JP62-226413 and Funayama et al. This rejection is overcome in view of the amendment of claim 8 together with the following remarks.

Claim 8, as amended, recites a thin-film magnetic head having a lower core layer, an upper core layer and a magnetic pole portion between the upper and lower core layers. One or both of the upper magnetic pole layer and the lower magnetic pole layer comprise a plated magnetic film comprising CoFe. Claim 8 further recites that the plated magnetic film comprise columnar crystals that are provided adjacent to one another in a film surface direction with grain boundaries extending in the film thickness direction and separating the columnar crystals. Further, a centerline average roughness of the film surface of the plated magnetic film is 2.5 nm or less. The Applicants respectfully assert that their claimed thin-film magnetic head is not suggested or disclosed by the combination of cited references.

In their specification, the Applicants teach that a magnetic film formed to have the recited morphology exhibits an improved surface roughness. The improved surface roughness provides a thin-film magnetic head having improved corrosion resistance, saturation magnetic flux density, and reduction in the coercive force. (para. 0014). As described by the Applicants in paragraph (00157) of their specification and shown in the SIM micrograph of FIG. 23, flattening of the lower magnetic pole layer 19 and the upper magnetic pole layer 21 enable the upper and lower magnetic pole layers to have a

rectangular shape elongated in the width direction of the thin-film magnetic head. The flattening of the upper and lower magnetic pole layers enables the gap layer to be formed to very precise dimensions, which improves the performance of the magnetic head when reading and writing high density media on a magnetic disk.

The Applicants respectfully assert that the claimed thin film magnetic head provides an improved structure that is not disclosed by the cited combination of references. The Applicants' foregoing remarks pertaining to Funayama are incorporated by reference herein. The Applicants' assert that the addition of Kudo et al. and the JP reference do not overcome the deficiencies of Funayama et al. since Kudo discloses a CoNiFe film, the magnetic film of Kudo et al. cannot meet the claim limitation of CoFe columnar crystals that are adjacent to one another. Further, Kudo et al. do not suggest or disclose the claimed surface roughness achieved by the Applicants CoFe magnetic film. The Applicants further assert that the JP reference does not suggest or disclose a magnetic head having magnetic pull layers exhibiting the claimed surface roughness.

Claims 9 and 12-19 depend either directly or indirectly from claim 8. These claims are allowable in view of the amendment and remarks pertaining to claim 8.

Claim 11, as formerly dependent upon claim 8, appears to be rejected over the same combination of references as claim 8. The applicants assert that claim 11 is allowable in view of the amendment and remarks pertaining to claim 1 from which it now depends.

Claim 10 has been rejected over Kudo et al. in view of the JP reference, Funayama et al., and Soto et al. This rejection is now moot in view of the cancellation of claim 10.

Claims 12-17 have been rejected over Kudo et al. in view of the JP reference, Funayama et al. and Liu et al. This rejection is overcome in view of the amendment of claim 8 together with the following remarks.

The Applicants' foregoing remarks pertaining to Funayama et al., the JP reference, and Kudo et al. are incorporated herein. The Applicants respectfully assert that Liu et al. does not overcome the deficiencies of the remaining references. None of these references suggest or disclose a thin-film magnetic head having the recited

structure that includes magnetic pole layers having adjacent columnar CoFe crystalline film structure with a centerline average roughness of 2.5 nm or less.

New Claims

Claims 20-24 are newly added in order that the Applicants can more fully claim the subject matter of their invention.

Claim 20 recites the magnetic head of claim 8 in which the gap layer comprises NiP plated film between the upper and lower magnetic pole layers. (See para. 0069-0072).

Claim 21 recites a 60% to 90% weight of Fe and a coercive force of no more than about 15Oe. (See para. 00125).

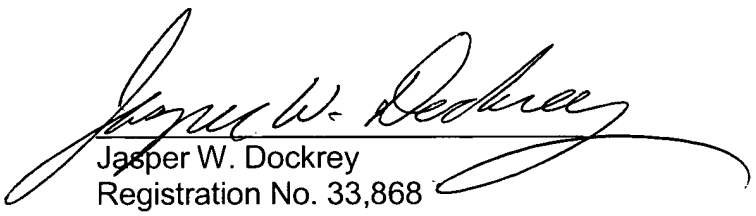
Claim 22 recites the plated magnetic film of Claim 1 in which the film comprises 60% to 72% by weight Fe and a coercive force of no more than about 10Oe. (See para. 00125).

Claim 23 recites the magnetic film of Claim 1 in which the magnetic film comprises 60% to 72% by weight Fe and a film stress of no more than about 1,000 MPa. (See para. 00127).

Claim 24 recites the plated magnetic film of Claim 1 in which the specific resistance is at least about 20 $\mu\Omega$•cm. (See para. 00126).

The Applicants have made a novel and non-obvious contribution to the art of magnetic film compositions and thin-film magnetic head technology. The claims at issue distinguish over the cited references and are in condition for allowance. Accordingly, such allowance is now earnestly requested.

Respectfully submitted,



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